

Less emission from hill farms

There's been an exciting discovery with greenhouse emissions, writes **Gerald Piddock**.

New research shows that New Zealand hill country farming may be producing fewer greenhouse gas emissions than previously thought.

Work by AgResearch and Landcare Research has determined that the amount of nitrous oxide emitted from urine patches is driven by a farm's steepness.

For medium and steep slopes, current data suggests the emission factor is less than half when compared to flat areas, senior soil scientist Tony van der Weerden said.

Speaking at a field day at Onehai Station north of Awakino, he said it was an exciting discovery.

The lower emissions were probably due to lower soil biological activity and fertility on the sloping land compared to the soil on flat land, because stock will transfer nutrients from slopes to flat land through urine and dung.

"There's much tighter nitrogen cycling going on in medium slopes and sloping land, it's not so rich in activity and we think that's having an influence on the emission factors," he said.

The urine patch from livestock on a hill country slope is distrib-

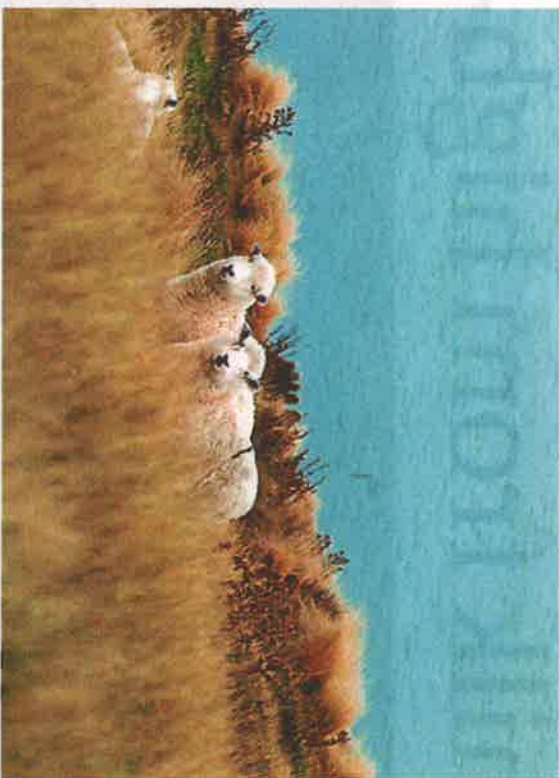
uted over a larger area compared to flat land, which potentially increased the affected soil's nitrogen use efficiency. Urine patches on slopes can often be seen as long lines of darker green growth.

Much of the research in the past 15 years had been carried out on dairying in lowland areas, where scientists have determined that New Zealand has a country-specific emission factor of 1 per cent along with 0.25 per cent for dung.

These agricultural emissions are currently seen to be evenly split between 50 per cent dairy and 50 per cent from sheep and beef and deer. However, the lower emission factors measured on medium and steep sloping hill country would reduce the total nitrous oxide emissions from the sheep and beef and deer sector.

New Zealand had an obligation to report its greenhouse gas inventory to the UN and the Ministry for Primary Industries is funding field trials to confirm the lower values.

He stressed it was not a mitigation strategy, it did not include methane emissions and real agricultural emission levels had not changed.



A reduction in the calculated emissions was potentially a powerful marketing tool for Beef +Lamb where consumers were increasingly demanding food that was produced with a lower emissions profile, AgResearch senior scientist Robyn Dynes said. "It could potentially deliver a huge plus for sheep and beef farmers when we think about global consumers. It is important to New Zealand's future, it is important to how discerning consumers view our product."

New Zealand also had to be seen to be making a fair contribution to reducing GHG

emissions, and the country relied on global consumers to buy its products, she said.

"They are looking at footprints, so our GHG footprint from hill country could potentially, because of the science, be seen as reduced."

Scientists are able to measure the emissions by collecting gas samples from covers placed over fresh urine patches.

Urine is collected from sheep or cattle, analysed for the nitrogen content and then poured onto the soil, where it is covered periodically for an hour and gas samples are taken at 30-minute intervals.

Once analysed, the change in

concentration of nitrous oxide over that time is used to calculate emissions from the urine-affected soil.

Those emissions are measured for three months following the urine application. The emissions are the heaviest in the first month before tailing off over the remaining two. Emission factors, which is the percentage of nitrogen that is lost as nitrous oxide, are also calculated, and these have been found to be lower on slopes than on flat land.

Dynes said work was continuing on testing inhibitors and vaccines as solutions to methane emissions. Summer rape crops were also looking promising after tests showed there was a 20 per cent emission reduction when consumed.

AgResearch was also looking into livestock genetics and had flocks of low emission sheep that were producing less methane. "The ideal of course is that if we could capture that methane, turn it into something where you capture a productive gain - that's the holy grail."

Livestock on steep hill country emit half as much of the greenhouse gas nitrous oxide as those farmed on flatland.